WHAT IS CLAIMED IS:

1. A catheter for cooling tissue, comprising:

a supply lumen for conducting cooled fluid distally toward said tissue;

a return lumen for conducting a first portion of said fluid proximally away from said tissue; and

a distal port for delivering a second portion of said fluid to said tissue.

2. The catheter of clam 1, wherein said supply and return lumens are coaxially arranged.

3. The catheter of claim 2 wherein said supply lumen is disposed within said return lumen.

4. The catheter of claim 1, wherein said portions are adjustable.

5. The catheter of claim 4, further comprising a valve disposed near said distal end of said catheter for adjusting said portions.

6. The catheter of claim 5, wherein said valve is adjustable from the proximal end of said catheter.

7. The catheter of claim 5, wherein said valve comprises a needle valve.

8. The catheter of claim 5, wherein said valve comprises a slide valve.

9. The catheter of claim 1 wherein flow of said cooled fluid through said supply lumen and through said return lumen is generated by positive pressure applied to the fluid in the supply lumen.

10. The catheter of claim 1, wherein flow of said cooled fluid through said supply lumen is generated by positive pressure applied to the fluid in the supply lumen and wherein flow of said fluid through said return lumen is assisted by negative pressure applied to the fluid in the return lumen.

11. A percutaneously introduced catheter for cooling tissue, comprising:

a first lumen for conducting a first flow of cooled fluid toward said tissue; and

a second lumen for insulating said fluid being supplied to said tissue with a second flow of cooled fluid.

12. The catheter of claim 11, wherein said second flow comprises a portion of said first flow.

13. The catheter of claim 12, wherein said second flow is conducted away from said tissue.

14. The catheter of claim 12, wherein the difference between said first and said second flows is delivered to said tissue.

15. The catheter of claim 12 wherein said first lumen and said second lumen are coaxially arranged.

16. The catheter of claim 12, wherein said first and second flows are adjustable.

17. The catheter of claim 16, further comprising a valve for adjusting said flows.

18. The catheter of claim 17, wherein said valve is disposed near the distal end of said catheter.

19. The catheter of claim 18, wherein said valve comprises a needle valve.

20. The catheter of claim 18, wherein said valve comprises a slide valve.

21. A percutaneously introduced catheter for cooling tissue, configured for conducting a flow of cooling fluid to and from said tissue such that a portion of said flow comprising less than all of said flow is expelled from said catheter into said tissue.

22. The catheter of claim 21, wherein the portion of said flow that is expelled from said catheter is adjustable.

23. The catheter of claim 22, wherein catheter is configured such that said portion of said flow that is expelled from said catheter is adjustable while said flow of cooling fluid is being conducted toward and away from said tissue.

24. The catheter of claim 21, wherein said catheter is configured such that fluid flowing away from said tissue insulates fluid flowing to said tissue.

25. The catheter of claim 24, wherein said catheter is configured such that fluid flowing away from said tissue surrounds fluid flowing to said tissue.

26. A method for treating acute myocardial infarction in a patient comprising:

percutaneously introducing into the patient a catheter having a distal end and advancing said distal end into the aorta;

causing cooled fluid to flow distally through said catheter at a flow rate higher than is intended for delivery into a myocardial bed;

allowing only a flow rate that is intended for delivery to said myocardial bed to be expelled from near the distal end of said catheter; and

causing the remainder of said flow to flow proximally through said catheter to outside said patient.